

WHAT IS CLAIMED IS:

1. A program product operable on a computer, the program product comprising:
a computer-usable medium; wherein the computer usable medium comprises
instructions comprising steps of:
 - 5 displaying a Chinese Zhu-Yin phonetic soft keyboard and a phrase
candidate window on the screen, with the Zhu-Yin phonetic soft keyboard
consisting of a section for consonants in C-set, a section for transition
vowels in H-set, a section for vowels in V-set, a section for tones in T-set,
and a set of function keys;
 - 10 translating the input device event signal sequence of “press”, “touch” and
“release” corresponding to keys in the C-set, the H-set, the V-set, and the
T-set into a sequence of partial Zhu-Yin spellings according to an
automatic partial Zhu-Yin spelling separation protocol;
 - extracting from a phrase database a set of phrases that match the generated
15 sequence of partial spellings;
 - displaying the extracted matching phrases onto buttons in the phrase
candidate window; and
 - responding to the release or click event signals on a phrase button by
exporting the phrase of the selected button to a receptive background
20 application program.
2. The program product of Claim 1, wherein said *automatic partial Zhu-Yin
spelling separation protocol* is defined by a five state {0, 1, 2, 3, 4}
nondeterministic automaton P, with the initial state 0, and with the state
transition and input/output relation being defined by sextuples (current state,

current partial string, input event, output symbol string, next state, next state partial string) as follows:

- (0, "", press the key of consonant "c", "~ c", 1, "c");
- (0, "", press the key of transition vowel "h", "~ h", 2, "h");
- 5 (0, "", press the key of vowel "v", "~ v", 4, "v");
- (0, "", press the key of tone "t", "~ t", 0, "");
- (1, current string "X", touch the key of transition vowel "h", "h", 2, "Xh");
- (1, current string "Xc" with "c" being a consonant, release the key of "c", "", 3, "Xc");
- 10 (1, current string "X", release the key of vowel "v", "v", 3, "Xv");
- (2, current string "Xh" with h being a transition vowel, release the key of "h", "", 3, "Xh");
- (2, current string "X", release the key of vowel "v", "v", 3, "Xv");
- (3, current string "X", empty input, "", 0, "");
- 15 (3, current string "X", touch the key of tone "t", "t", 0, "");
- (4, current string "Xv" with "v" being a vowel, release the key of "v", "", 0, ""),

where symbol "~" represents the separation mark between partial spellings, "" represents an empty string, and "X" represents a phonetic symbol string.

- 20 3. The program product of Claim 1, wherein said Chinese Zhu-Yin phonetic soft keyboard consists of the following key sections:

22 C-set keys of the 21 consonants "ㄅ" to "ㄎ" plus a blank consonant;

4 H-set keys of the 3 transition vowel { ㄣ, ㄨ, ㄩ } plus a blank transition vowel;

- 14 V-set keys of the vowels “Y” to “儿” plus a blank vowel;
- five T-set keys of the tonal symbols { ‘, --, ‘, ~, ` }; and
- function keys including a key to change the phonetic mode of the system, a key to erase the phonetic symbol string of the current word, a key to
- 5 change the phrase window to the previous page, and a key to change the phrase window to the next page.
4. The Chinese Zhu-Yin phonetic soft keyboard of Claim 3 , wherein said phonetic symbol keys and tonal keys are grouped into C (consonant), H (transition vowel), V (vowel), and T (tone) sections and placed consecutively
- 10 from top to bottom on the keyboard, said keys are further grouped and arranged as follows:
- a. the 22 C-set keys are gathered into six groups as { ㄅ ㄆ ㄇ ㄏ ㄣ ㄌ, ㄍ ㄊ ㄋ ㄒ ㄗ ㄘ, ㄙ ㄥ ㄩ ㄩ ㄚ ㄛ, ㄜ ㄝ ㄟ ㄠ ㄡ ㄢ, ㄣ ㄤ ㄨ ㄩ ㄚ ㄛ, ㄜ ㄝ ㄟ ㄠ ㄡ ㄢ blank }, with the six groups arranged
- from top to bottom and from left to right in the C section area;
- 15 b. the 4 H-set keys { ㄟ ㄠ ㄡ ㄢ blank } are arranged in an array and placed between the C section and the V section (immediately below the C section, and right above the V section), with the dimension of the H array arranged to be perpendicular to the direction from the C section to the H section;

- c. the 14 V-set keys are gathered into three groups as { 丫 ㄣ ㄗ ㄘ ㄙ ㄥ ㄨ ㄩ ㄨ ㄩ ㄨ ㄩ ㄨ ㄩ }, with the three groups arranged from left to right in the V section area;
 - d. the five T-set keys { ' , -- , ' , ~ , ' } are arranged in an array and placed into a T section area below the V section, with the dimension of the T array arranged to be perpendicular to the direction from the V section to the T section;
 - e. the keys within each group of the C, H, V, and T sections are arranged in the standard Zhu-Yin symbol order inside the group.
 - f. spaces are reserved to separate neighboring groups.
5. A program product operable on a computer, the program product comprising: a computer-usable medium; wherein the computer usable medium comprises instructions comprising steps of:
- displaying an initial Chinese Pin-Yin soft keyboard and a phrase candidate window on the screen, with the initial Chinese Pin-Yin soft keyboard consisting of a section of alphabet symbols “A” to “Z” in I-set, a section for tones in T-set, a set of function keys;
 - displaying an N-set panel of keys of the next substring of alphabet symbols in N-set, in response to the selection of an initial alphabet symbol from the I-set;
 - displaying an R-set panel of keys of the remaining substring of alphabet symbols in R-set, in response to the selection of an initial alphabet

symbol from the I-set and the selection of a next substring of alphabet
 symbols from the N-set ;
 translating the input device event signals sequence of “press”, “touch”
 and “release” on keys of the I-set, the N-set, the R-set, and the T-set into
 5 a sequence of partial Pin-Yin spellings according to an *automatic partial
 Pin-Yin spelling separation protocol*;
 extracting from a phrase database a set of phrases that match the
 generated sequence of partial Pin-Yin spellings;
 displaying the extracted matching phrases onto buttons in the phrase
 10 candidate window; and
 responding to the release or click event signals on a phrase button by
 exporting the phrase of the selected button to a receptive background
 application program.

6. The program product of Claim 1, wherein said *automatic partial Pin-Yin
 15 spelling separation protocol* is defined by a four state {0, 1, 2, 3}
 nondeterministic automaton P, with the initial state 0, and with the state
 transition and input/output relation being defined by sextuples (current state,
 current partial symbol string, input event, output symbol string, next state,
 next state partial symbol string) as follows:
 20 (0, “”, press a key of an initial alphabet “x”, “ ~ x”, 1, “x”);
 (1, alphabet “x”, touch the key of an alphabet “y” with “xy” being a leading
 string in a Pin-Yin spelling, “y”, 2, “xy”);
 (1, alphabet “x”, touch the key of a length-two string “Hy” with “xHy” being a
 leading string in a Pin-Yin spelling, “Hy”, 2, “xHy”);
 25 (1, alphabet “x”, release the key of symbol “x”, “”, 3, “x”);

- (2, current string “Xy”, release the key of the symbol “y”, “”, 3, “Xy”);
- (2, current string “X”, release the key of a length-two string “Hy” , “”, 3, “XHy”);
- (2, current string “X”, release a key of a string “R” with “XR” being a Pin-
5 Yin spelling, “R”, 3, “XR”);
- (3, current string “X”, empty input, “”, 0, “”);
- (3, current string “X”, touch the key of a tone “t”, “t”, 0, “”);
- where symbol “~” represents the separation mark between partial spellings, “” represents an empty string, “H” is the alphabet symbol *H*, “x” and “y” are
10 dummy alphabet symbols, and “X” and “R” represent alphabet symbol strings.
7. The method of claim 5, wherein said initial Chinese Pin-Yin soft keyboard consists of:
- an I-set panel containing 26 alphabet keys from “A” to “Z”;
- a T-set panel containing the five tonal keys { ‘, --, ‘, ‘, ‘ }; and
- 15 function keys including a key to change the phonetic mode of the system, a key to erase the symbol string of the current partial syllable, a key to change the phrase window to the previous page, and a key to change the phrase window to the next page.
8. the initial Chinese Pin-Yin soft keyboard of Claim 7, wherein said I-set
20 alphabet keys are gathered into eight groups as [ABCD, EFG, HIJ, KLMN, OPQ, RST, UVW, XYZ], arranged in the alphabetical order, and placed from left to right, top to bottom into the I-set panel with spaces reserved between neighboring groups.

9. the initial Chinese Pin-Yin soft keyboard of Claim 7, wherein the five tonal T-set keys { ‘, --, ‘, ~, ‘ } are arranged in an array and placed below the said I-set panel.
10. The program product of Claim 5, wherein said next substring of alphabet symbols in N-set are alphabet symbols that are none-H second symbols in a Pin-Yin spellings, or, are the strings of the second and the third symbols in a Pin-Yin spelling with the second symbol being the “H” symbol.
11. The program product of Claim 5, wherein said N-set of keys that do not begin with symbol “H” are arranged into a one array panel and shown above the I-set panel; while those with associated next substrings beginning with symbol “H” are arranged in a second panel and shown below the I-set panel.
12. The program product of Claim 5, wherein said remaining substring of alphabet symbols in R-set are the remaining symbol string of an initial symbol in the I-set and a next symbol substring in the N-set in a Pin-Yin spelling.
13. The program product of Claim 5, wherein said R-set panel of keys are arranged in a panel and put on top of the I-set panel.